

# Controlling for Culture-Specific Response Styles in the Value of Children Study: Calibrated Sigma Method and Ipsatization Procedures

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# Response Styles in Cross-Cultural Research

## > Acquiescent Response Style (ARS)

- “Yea-Saying” or tendency to agree with a statement irrespective of content
- No problem as long as comparing groups that do not differ in ARS
- ARS varies considerably across cultural groups and seems to have systematic relations to widely-used dimensions of cultural values
  - More pronounced in cultures high in collectivism and power distance  
→ agreeing to items part of tendency to stay in harmony with one’s group
  - Methods for studying ARS vary:
    - a) Overall means across a large number of content-independent items that include both positively and negatively phrased items
    - b) Using pairs of positively and negatively phrased items with same content
  - Results mixed and partly contradictory
  - May be more pronounced for items carrying high personal relevance

Baumgartner & Steenkamp (2001)   Baumgartner & Weijters (2015)   Van Vaerenbergh & Thomas (2012)

# Response Styles in Cross-Cultural Research

- > **Extreme Response Style (ERS) (vs. Middling Response Style)**
  - Tendency to use the extreme ends of a scale irrespective of item content (e.g., '*strongly disagree*' and '*strongly agree*' on a 5-point scale)
  - Cultural differences in ERS attributed to
    - Emphasis on sincerity vs. modesty in social interactions
    - Individualism because of its low concern with consequences of expressing strong opinions
  - Mixed results of studies linking cultural characteristics to ERS
  - ERS confounded with ARS when all (or most) items positively phrased
- > **Social Desirability Responding (SDR)**
  - Tendency to respond in a socially desirable way to get approval by significant others
    - Two processes: impression management (conscious) and self-deception (unconscious)
  - Linked to item content and therefore different from ARS and ERS

Benitez, He, Van de Vijver, & Padilla (2016) Harzing (2006) Johnson, Kulesa, Cho, & Shavitt (2005)  
Kemmelmeier (2016) Morren, Gelissen, & Vermunt (2012) Smith et al. (2016)

# Controlling for Response Styles

- > Ipsatization (Within-Subject-Standardization)
  - “Single Construct” (e.g. Schwartz values)
  - “All items of a questionnaire”
    - ➔ “Fixed Pie-Effect” – possibly controlling for content!
  - Psychological assessment literature: ipsatized measures appropriate with large number of constructs (> 10) and low intercorrelations among constructs (< .30)
- > Representative Indicators Response Style Measures (RIRS-Method)
  - Random selection of uncorrelated items measuring different constructs
  - Building RS-indicators by counting different categories
  - Residualization method: RIRS as ANCOVA control variables (adjusted means)
  - Alternative: Using Grand Means of RI as basis for ipsatization procedure

Baron (1996) Bartram (1996) Baumgartner & Steenkamp (2001) Baumgartner & Weijters (2015)  
Fischer (2004) Fischer & Milfont (2010) Hicks (1970) Mayer (2015) Rammstedt & Farmer (2013)  
Schwartz (1992) Van Vaerenbergh & Thomas (2012) Weijters, Schillewaert, & Geuens (2008)

# Controlling for Response Styles

- > **Calibrated Sigma Values Method (CSVM)** (Weijters, Baumgartner, & Geuens, 2016)
  - Values recoded into z-scores (sigma values) derived from the relative endorsement frequency of the category in the group
  - Cumulative proportions recoded using the *inverse cumulative distribution function*

$$\sigma_{k,g} = \Phi^{-1} \left[ \frac{1}{2} \times (P_{k,g} + P_{k-1,g}) \right]$$

Group 1	1	2	3	4	5
$h_k$	0.10	0.15	0.15	0.25	0.35
$P_k$	0.10	0.25	0.40	0.65	1
$\frac{1}{2} (P_k + P_{k-1})$	0.05	0.175	0.35	0.525	0.825
$\sigma_k$	-1.645	-0.935	-0.385	0.063	0.935

Group 2	1	2	3	4	5
$h_k$	0.20	0.20	0.20	0.20	0.20
$P_k$	0.20	0.40	0.60	0.80	1
$\frac{1}{2} (P_k + P_{k-1})$	0.10	0.30	0.50	0.70	0.90
$\sigma_k$	-1.282	-0.524	0	0.524	1.282

# Aim of Current Study

- > Comparing Different Response Style Adjustment Methods with the Example of Family Values in the VOC-Study
  - Family Values important indicator of collectivism
  - “Value-laden” construct → appropriate for studying response style adjustment
- > Methods to be Compared
  - Ipsatization using RIRS-Method
  - Calibrated Sigma Values Method
  - Residualization method using response style indicators based on RIRS

# VOC-Project: Mothers and Adolescents from 17 Cultural Groups Trommsdorff & Nauck (2005)

Cultural Group	Mothers	Adolescents
Germany	310	311
Turkey	286	298
China	303	293
Indonesia	281	300
France	195	196
Ghana	238	285
India	162	287
Poland	575	574
USA	337	337
South Africa	315	312
Russia	228	221
South India	298	300
Estonia	300	300
Jamaica	311	
Israel	184	188
Palestinians & Israeli Arabs	169	175
Total	4492	4377

# Family Values

- > Combination of five-item short scale based on Georgas et al. (2006) and family-adapted Interdependence-scale by Singelis (1994)

1	2	3	4	5
Strongly disagree	Slightly disagree	Neither agree nor disagree	Slightly agree	Strongly agree

1. One should maintain good relationships with one's relatives.
2. Children have an obligation to care for their parents when their parents are old.
3. A family's problems should be solved within the family.
4. We should honor and protect our family's reputation.
5. Children should obey their parents.
6. It is important to me to respect decisions made by my family.
7. I often have the feeling that my relation with my family is more important than my own accomplishments.
8. My happiness depends on the happiness of my family.
9. It is important for me to maintain harmony within my family.
10. I would sacrifice my self-interest for the benefit of my family.



# Item Selection, RIRS Ipsatization and Response Style Indicators

- > Some items/constructs had to be discarded since...
  - not included all cultural groups
  - items of mothers / adolescents not identical
  - too many missings (e.g. relationship with grandparents)
- > 83 items (12 constructs)
- > Ipsatization across 2 extracted subsets of 12 items (excluding items from target construct)
  - Subtract grand mean (mean centering MC) + divide by grand SD (full ipsatization FIPS)
  - Same with grand mean / SD on culture level
- > Acquiescence and Extremity indicators based on two different subsets of 12 randomly selected items
  - ARS: double count 5 + count 4 / divide by number of items
  - ERS: count 1 + 5 / divide by number of items

# Selection of Calibration Items

- > PCA (whole survey) (create 2 random groups in every component, exclude target construct / component)
- > (Squared) correlation matrix  
→ subsequently remove items with largest row sum

## RIRS calibration items 1

Item	Loadings on components 1-9 (composite)					
1	.60	-.04	.10	.00	.01	-.05
2	.03	.02	.56	.04	-.02	-.02
3	.15	.05	.47	.03	.07	-.02
4	.00	.03	.43	-.12	.11	.04
5	.06	.08	.08	.59	.07	.02
6	-.01	.15	-.02	.18	.57	.04
7	-.03	.01	.03	-.09	.06	.58
8	.01	.02	-.05	.07	.06	.54
9	.03	.05	-.06	.07	.02	.08
10	.04	-.02	.05	.04	-.01	.24
11	.06	.01	.00	-.05	.02	.09
12	.03	.06	.22	.05	.07	.07

Item	Loadings on components 1-9 (composite)								
1	.70	.00	.08	.01	.06	-.03	-.07	.02	-.04
2	.11	-.05	.55	.11	-.07	-.01	-.07	-.04	.23
3	.03	.06	.54	-.06	.06	.03	-.10	.06	-.27
4	.12	.04	.07	.60	.07	-.04	.00	.04	.11
5	-.08	.17	-.07	.01	.71	.08	.06	.00	.04
6	-.03	.03	.00	.15	-.01	.53	.09	.16	.05
7	-.03	.15	-.06	-.13	.11	.52	.01	.21	-.08
8	-.06	.10	-.10	.08	.07	.07	.75	-.04	.00
9	-.07	.27	-.20	-.03	.09	.01	.28	.14	.26
10	.04	-.07	.12	.04	-.01	.19	-.02	.56	.07
11	.11	-.01	.17	.10	-.02	.01	.01	-.11	.61
12	.01	.20	-.01	.04	.14	.11	-.03	.12	.43

## RIRS calibration items 2

Loadings on components 1 - 9										
.78	-.07	.08	.04	.05	-.03	-.06	-.02	.01		
.76	-.13	.00	.03	-.03	.03	.01	.05	.01		
.76	-.06	.05	-.01	-.04	-.03	-.05	.01	.00		
.75	-.07	.04	.00	.02	-.03	.00	.01	-.01		
.73	-.06	.09	.07	.05	-.02	-.04	.02	.04		
.72	-.01	.08	.08	.04	.06	-.01	-.01	-.01		
.72	-.11	.04	.03	.09	.00	-.06	.04	.05		
.70	.00	.08	.01	.06	-.03	-.07	.02	-.04		
.67	-.04	.16	.22	-.11	-.01	.01	.02	.01		
.66	-.12	.11	.14	.03	.02	.05	.03	.06		
.62	-.03	.15	.19	.09	.01	.05	.02	.03		
.60	-.04	.10	.00	.01	.05	-.04	.00	-.01		
.56	-.05	.17	.22	-.13	-.02	.11	.00	.07		
-.07	.65	-.02	-.06	.17	.05	.13	.08	.08		
-.06	.63	-.02	.11	.09	.09	-.03	.07	-.13		
-.02	.58	-.02	.11	.09	.05	.16	-.04	.14		
-.05	.57	.04	.00	.10	.06	.15	.06	.18		
-.08	.56	.06	.20	-.02	.05	.01	-.09	-.05		
-.04	.56	.04	.02	.14	-.04	.09	.12	.20		
-.07	.55	-.06	.05	.09	.11	.04	-.01	.06		
-.05	.54	-.04	.06	.07	.04	.01	.17	-.10		
-.06	.54	-.03	.11	.09	.01	-.01	.06	-.06		
-.09	.53	-.04	.06	.08	.32	.04	-.25	-.09		
-.08	.49	.02	.08	.05	.39	-.05	-.19	-.04		
-.08	.48	.00	.01	.09	.41	.03	-.19	-.11		
-.04	.45	.05	.12	.07	-.03	.04	.01	.25		
-.06	.36	-.08	-.07	.07	.10	.14	.20	.04		
-.05	.29	.04	.18	-.03	.03	.01	.23	.13		
.07	-.02	.68	.09	-.05	-.03	.05	.01	-.07		
.11	-.06	.64	.02	-.01	-.02	.04	.04	-.05		
.10	-.05	.63	.10	.08	-.03	.02	.04	-.02		
.08	-.02	.61	.06	.04	-.02	-.10	-.07	.16		
.07	.03	.61	.08	.02	-.03	-.12	-.01	.15		
.10	-.03	.59	.11	-.04	-.01	-.09	-.05	.18		
.05	-.01	.56	.09	-.05	.00	.13	.03	.01		
.03	.02	.56	.04	-.02	-.02	.04	.12	.01		
.11	-.05	.55	.11	-.07	-.01	-.07	-.04	.23		
.03	.06	.54	-.06	.06	.03	-.10	.06	-.27		
.14	-.02	.54	.13	-.06	.01	-.15	.04	.00		
.15	.05	.47	.03	.07	-.02	-.14	-.03	.21		
.00	.03	.43	-.12	.11	.04	.02	.12	-.38		
.19	.04	.11	.66	.04	-.04	-.03	.03	.09		
.10	.10	.06	.65	.12	-.01	-.01	.00	.03		
.03	.07	.11	.64	.21	.03	.04	.02	.03		
.11	-.04	.11	.63	.01	.01	.07	-.01	.14		
.11	.15	.01	.60	.17	-.06	.03	.03	-.07		
.12	.04	.07	.60	.07	-.04	.00	.04	.11		
.06	.08	.08	.59	.07	.02	.08	-.08	.06		
.04	.07	.12	.55	.14	.05	.00	.03	-.04		
.08	.14	-.01	.51	.33	-.04	.00	.09	-.05		
.02	.12	-.02	.43	.40	.05	-.03	.03	-.04		
-.07	.13	-.05	.08	.74	.08	.04	.01	.05		
-.08	.11	-.02	.15	.71	.05	.03	.02	.09		
-.08	.17	-.07	.01	.71	.08	.06	.00	.04		
-.07	.09	-.02	.17	.71	.07	.05	-.02	.11		
-.01	.15	-.02	.18	.57	.04	.04	.01	.02		
-.07	.08	.03	.31	.53	.11	.05	.10	-.09		
-.03	.11	.02	.30	.51	.12	.05	.05	-.10		
-.07	.15	.03	.39	.40	.07	.02	-.01	.07		
.01	-.01	-.03	-.02	.07	.60	.08	.17	.12		
-.03	.01	.03	-.09	.06	.58	.08	.15	.02		
-.07	.16	-.04	-.09	.12	.55	.00	.22	-.08		
.01	.02	-.05	.07	.06	.54	.06	.15	.13		
.02	-.03	-.04	.06	.06	.54	.10	.16	.18		
-.03	.03	.00	.15	.01	.53	.09	.16	.05		
-.03	.15	-.06	.13	.11	.52	.01	.21	-.08		
-.03	.32	.00	.00	.03	.48	-.02	-.14	-.09		
-.12	.37	.01	-.01	.01	.45	.00	.16	.12		
-.01	.40	.05	.03	.06	.42	.09	-.12	.15		
-.06	.10	-.10	.08	.07	.07	.75	-.04	.00		
.03	.05	-.06	.07	.02	.08	.66	.02	-.06		
-.05	.32	-.09	-.02	.13	.05	.64	-.09	.02		
-.01	.13	-.20	.03	.06	.16	.57	.06	.05		
-.07	.27	-.20	-.03	.09	.01	.28	.14	.26		
.04	-.02	.05	.04	-.01	.24	-.02	.60	.04		
.04	-.07	.12	.04	-.01	.19	-.02	.56	.07		
-.01	.18	.08	.07	.05	.14	-.05	.49	-.04		
.01	.32	.05	.10	.11	.05	.04	.38	-.14		
.06	.01	.00	.05	.02	.09	.02	.38	-.01		
.11	-.01	.17	.10	-.02	.01	.01	-.11	.61		
.03	.06	.22	.05	.07	.07	.01	.05	.45		
.01	.20	-.01	.04	.14	.11	-.03	.12	.43		

# RIRS Items Correlation Matrix (Itemset 2)

Mothers: Mean of corrected item-total correlations: .11 (vs. .23)

	1	2	3	4	5	6	7	8	9	10	11	12
1	.18***	.07***	.07***	.07***	-.03*	-.01	-.02	-.10***	-.06***	.04*	.06***	-.01
2	.10***	.12***	.11***	.11***	-.03	.03*	-.03*	-.08***	-.08***	.12***	.13***	.10***
3	.07***	.14***	.09***	.01	-.01	.01	.00	-.11***	-.11***	.05**	-.04*	-.04*
4	.08***	.06***	.00	.21***	.07***	.05**	-.08***	.03	.04**	.08***	.09***	.08***
5	-.01	-.05**	-.01	.07***	.10***	.06***	.09***	.09***	.12***	.02	-.04**	.14***
6	-.03	.00	.01	.06***	.05***	.11***	.21***	.08***	.05***	.13***	-.01	.06***
7	.00	-.06***	.02	-.04*	.11***	.24***	.10***	.08***	.06***	.11***	-.06***	.05***
8	-.06***	-.06***	-.13***	.07***	.10***	.06***	.05***	.14***	.18***	.00	.00	.07***
9	-.05**	-.10***	-.09***	.06***	.13***	.09***	.06***	.18***	.11***	-.01	.03	.20***
10	.03	.07***	.04**	.01	.03*	.14***	.13***	.00	.01	.11***	.02	.07***
11	.04**	.11***	.03*	.09***	.01	-.02	-.04*	.03*	.09***	.03	.09***	.13***
12	-.03	.06***	-.02	.05**	.14***	.10***	.11***	.04*	.18***	.11***	.11***	.11***

Adolescents: Mean of corrected item-total correlations: .12 (vs. .23)

# Comparison of RIRS Methods

Mothers		RIRS Ipsatization				RIRS CSVM	RIRS ANCOVA Adjusted Means	
Culture	Approach	MC RIRS 2 Culture	MC RIRS 2 Person	FIPS RIRS 2 Culture	FIPS RIRS 2 Person	RIRS2 Culture	ARS RIRS2 Person	AERS RIRS2(1) Person
	Original							
Indonesia	4.70 <sup>a</sup>	1.21	1.21	0.94	0.96	0.87 <sup>a</sup>	4.66	4.68
South India	4.70 <sup>a</sup>	1.30	1.31	0.80	0.76	0.61 <sup>cde</sup>	4.59	4.51
South Africa	4.68 <sup>a</sup>	1.15	1.16	0.75	0.76	0.61 <sup>cde</sup>	4.56	4.49
Palestinians & Israel Arabs	4.65 <sup>ab</sup>	1.31	1.31	0.95	0.94	0.86 <sup>a</sup>	4.64	4.62
India	4.61 <sup>ab</sup>	1.15	1.15	0.81	0.81	0.69 <sup>bc</sup>	4.54	4.52
Ghana	4.54 <sup>bc</sup>	1.07	1.07	0.83	0.85	0.73 <sup>b</sup>	4.52	4.52
Jamaica	4.42 <sup>cd</sup>	0.91	0.91	0.62	0.61	0.50 <sup>fg</sup>	4.32	4.29
Israeli Jews	4.39 <sup>d</sup>	1.20	1.20	0.80	0.81	0.70 <sup>bc</sup>	4.40	4.38
Turkey	4.39 <sup>d</sup>	0.94	0.94	0.72	0.73	0.59 <sup>def</sup>	4.35	4.38
Poland	4.30 <sup>de</sup>	0.95	0.95	0.75	0.75	0.66 <sup>bcd</sup>	4.32	4.36
China	4.25 <sup>e</sup>	1.07	1.07	0.91	0.92	0.84 <sup>a</sup>	4.35	4.38
Russia	4.25 <sup>e</sup>	1.14	1.14	1.05	1.07	0.92 <sup>a</sup>	4.40	4.44
USA	4.23 <sup>e</sup>	0.98	0.98	0.66	0.67	0.56 <sup>ef</sup>	4.23	4.24
Estonia	4.03 <sup>f</sup>	0.88	0.88	0.77	0.78	0.67 <sup>bcd</sup>	4.15	4.19
France	3.98 <sup>f</sup>	0.91	0.91	0.67	0.68	0.58 <sup>def</sup>	4.08	4.06
Germany	3.90 <sup>f</sup>	0.73	0.73	0.56	0.57	0.46 <sup>g</sup>	3.98	4.00
Tertile changes	-	6	6	8	8	8	2	4
Rank changes	-	38	38	56	58	62	19	28
$\eta^2$ ( $\eta_p^2$ ) Culture	.229	.105	.079	.11	.086	.128	(.147)	(.134)
Adolescents								
Rank changes	-	30	30	36	36	38	8	10
$\eta^2$ ( $\eta_p^2$ ) Culture	.229	.192	.166	.166	.145	.172	(.187)	(.178)

# Culture-level Correlations with External Value Indicators (Hofstede, World Values Survey)

RIRS 2		Mothers				Adolescents			
n = 15-16		Hofstede PDI	Hofstede IND	WVS TradSec	WVS SurvSelf	Hofstede PDI	Hofstede IND	WVS TradSec	WVS SurvSelf
Family Values		.32	-.46	-.79**	-.50	.37	-.46	-.71**	-.46
MC		.35	-.38	-.52*	-.45	.34	-.4	-.39	-.44
FIPS		.63*	-.61*	-.33	-.79**	.51	-.61*	-.43	-.61*
CSVM		.58*	-.62*	-.29	-.76**	.52	-.66*	-.42	-.62*
ADJ Means ARS		.44	-.57*	-.76**	-.63*	.45	-.54*	-.64*	-.54*
ADJ Means AERS		.50	-.64*	-.78**	-.72**	.48	-.58*	-.65**	-.57*

\* p < .05    \*\* p < .01.

Hofstede (2001)    World Values Survey (2009)

# Discussion

- > Very similar results for RIRS ipsatization, CSVM and RIRS response style indicators (ANCOVA adjusted means)
  - Adj. Means most conservative method
  - Full ipsatization and CSVM very similar
  - Small differences between application level (culture vs. person)
- > Similar results when using two different calibration item samples
  - Selection of 2 x 12 uncorrelated items from only 83!
  - Differences may be smaller in larger / more heterogeneous surveys
- > Rank order of original means **not** strongly affected by controlling for culture-specific response styles (RIRS approach)
  - But: Single specific cultural groups strongly affected
- > Cross-cultural differences attenuated (from  $R^2 \approx .23$  to  $R^2 \approx .08 - .15$ )
- > RIRS ipsatization / CSVM useful approach for controlling response bias

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## “Value of Children and Intergenerational Relations”

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